

No. XXI.—RECOVERY FROM THE BITE OF A COMMON KRAIT
(*B. CANDIDUS*).

In July last, I was called early one morning to identify a snake which had bitten the cook working in a neighbour's bungalow. I found the man sitting on the door step with a large dead Krait (*B. candidus*) at his feet. He told me that on awakening and feeling by his pillow for his matches, he put his hand on the snake which bit him on the finger. He killed the reptile and rushed to the memsaheb for help. The lady incised the wound (very superficially) and rubbed in crystals of permanganate of potash and tied a ligature above the wrist. The local doctor was sent for and arrived half an hour after the incident; he deepened the incision, causing the finger to bleed very freely, and rubbed in more of the permanganate.

Beyond a swelling and pain in the hand below the wrist, due probably to the ligature, the man complained of no ill effects and suggested going off to the bazaar and getting on with his day's work. At 6-30 p.m. that evening, when I next saw him, he was in bed and said that he felt quite well. At 9 p.m. he complained of giddiness and pain in the shoulder; these symptoms passed off by midnight and the next day the man was back at work in the kitchen apparently well and fit.

The Krait was a particularly robust looking individual, measuring 3' 6", and from its distended condition I presumed that it had recently fed. On cutting open the stomach I found that it swallowed 3 or 4 large pieces of *cooked* meat, presumably kitchen scraps: rather an unusual meal for a snake!

BOMBAY NATURAL HISTORY SOCIETY,
10th October 1924.

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No. XXII.—NOTES ON THE STATUS OF SOME PARASITIC
HYMENOPTERA IN SOUTH INDIA.*

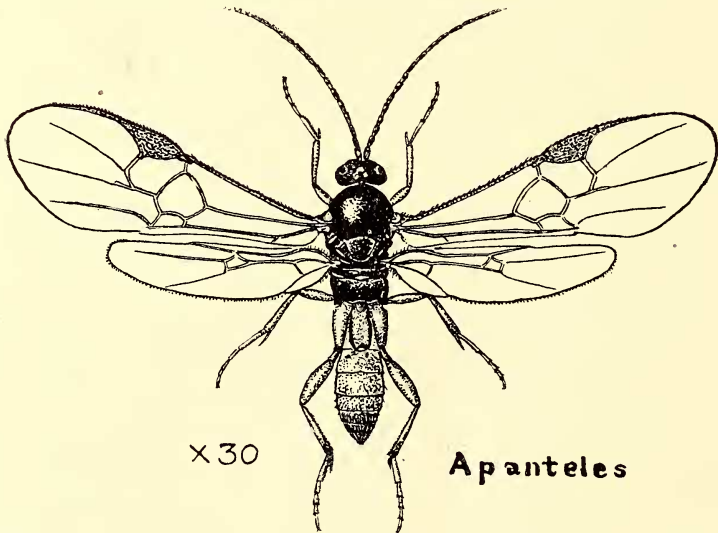
(With 3 plates.)

The parasitic Hymenoptera constitute a vast complex, in many respects, far more remarkable group than most other insects. Apart from the striking peculiarities in their general form and in the nature of their life-histories as parasites on other creatures, characters which in themselves might form absorbing themes of study for the pure scientist, their relations to other insects and to mankind give them a position of unique importance in the insect world. Their economic importance is based on the fact that many of them act as natural enemies of many insects which are injurious to cultivated crops and thereby check the rapid multiplication of such pests; in other words, they help man in controlling insect pests, often even without his knowledge. Well does Sharp remark in his classical volume on insects that "the parasitic Hymenoptera is one of the most neglected of the great groups of insects though it is of greater economic importance to mankind than any other." In spite of this two fold importance the study of the parasitic Hymenoptera found in India has not till now engaged the serious attention it deserves from entomologists, either from the purely Zoological or the economic aspect. This neglect cannot be attributed to the paucity of these insects in the Indian region, since numerous forms of this group are very commonly met with all over India; and it is very likely that entomologists in different parts of India possess at least a few of these insects in their collections. Most of these insects are comparatively small in size and do not make themselves so very conspicuous as some of the butterflies, beetles or grasshoppers to attract quick and sufficient attention; and of course the recognition of their economic importance is of very recent origin. Anyway it is felt that the time has already arrived to pay the attention that these insects deserve. In order, however, to properly appraise the utility or otherwise of these insects, it is essential in the

* This paper was read at the Indian Science Congress, Bangalore, in January 1924.

first place to get the parasitic fauna of the country properly identified and the correct relations which each insect bears to its surroundings properly noted, so that there may be no mistakes or confusion created. Though in the catalogues and papers of systematists like Brulle, Dalla Torre, Szepilgeti, Cameron, Morley, etc., there are stray records of a few species from South India, very little in the shape of reliable information is available on these insects; nor were any serious attempts made towards a systematic or biological study of them until very lately. The first attempt in this direction was made in 1912 and it is gratifying to note that it was made in this state (Mysore) by Dr. Coleman. He got together some material and had them properly studied by specialists, and as a result one or two systematic papers on these Mysore forms were published by Viereck in the Proceedings of the United States National Museum.† The writer of this paper has been paying some special attention to these insects in S. India for some time past, and with the idea of securing a working basis for detailed studies in the future, he got some of the commoner forms of South Indian parasites identified as far as possible, and published two lists‡, one in 1919 and another in 1921 including almost all parasitic Hymenoptera of economic importance so far studied in S. India. He has been carrying on his studies in the same direction since then, and in this paper the idea is to invite the attention of entomologists, especially those who are interested in the economic aspect of the subject, to the importance of the study of these insects by very briefly describing the bionomics so far known of a few typical species found in S. India.

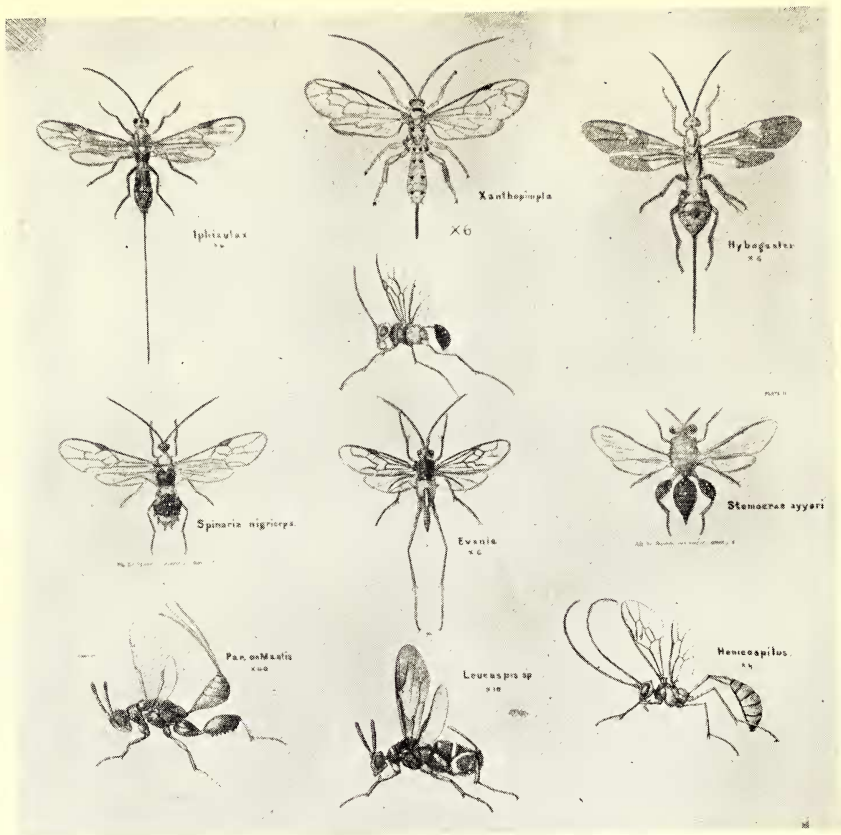
Of the parasitic groups of the order Hymenoptera the superfamilies Ichneumonoidea (including chiefly the families *Braconidæ*, *Ichneumonidae* and *Evanidæ* and the *Chalcidoidea* together form what may be aptly classed as parasites *par excellence* among insects, playing the most important role as natural enemies of various creatures. The insects noted below are only a few of the many common and typical species noted in South India.



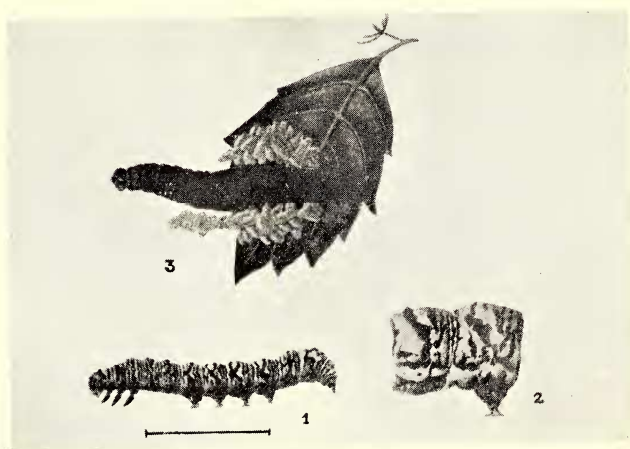
Braconidæ.—In this family which is very well represented in S. India, the commonest genus appears to be *Apanteles* (see fig. above). This genus

† Proc. of U. S. Nat. Museum, Vol. 42, 1912-13.

‡ Proceedings of the 3rd & 4th Entomological Meetings—Pusa, 1919 and 1921.



Some South Indian Parasitic Wasps.



Caterpillars of *Zalissa venosa* parasitised by *Apanteles*. (From Lefrey.)

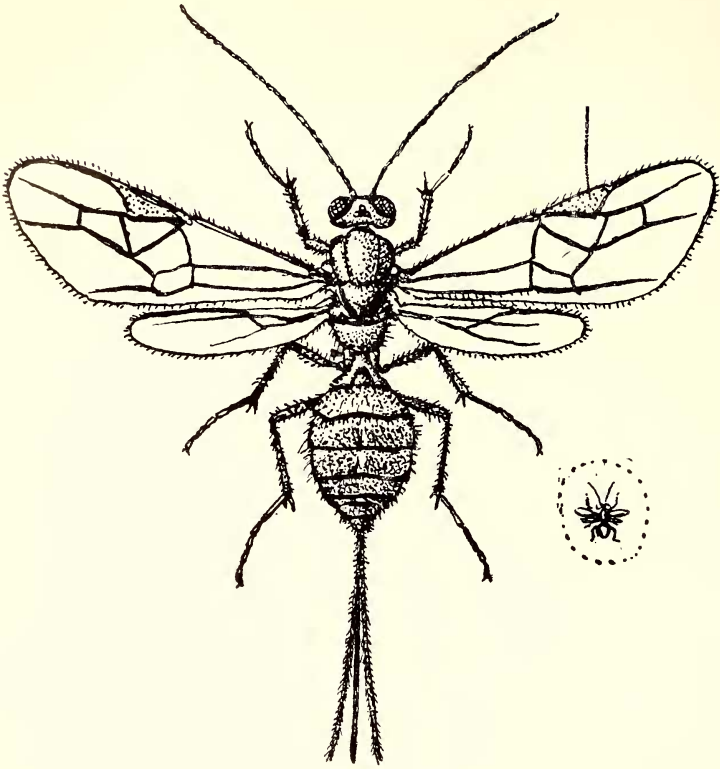


Fig. 1.

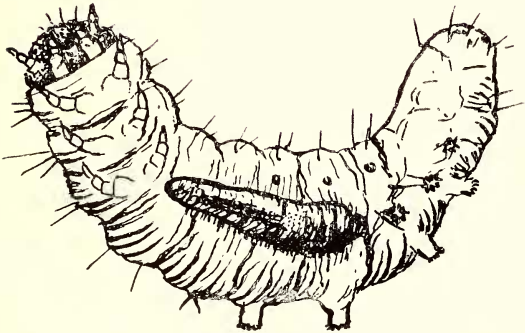


Fig. 2.

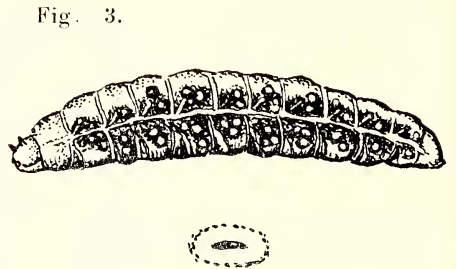


Fig. 3.

Fig 1. *Microbracon*.

Fig. 2. Caterpillar attacked by a parasitic grub.

Fig. 3. Parasitic grub magnified.

includes numerous very closely allied species of small wasps usually of a dark brown colour and with transparent wings. These insects have been found to parasitise the larvæ of numerous important lepidoptera and beetles, some of which are pests of first class importance to the farmer. The hosts of *Apanteles* till now noted include hairy caterpillars (Spp. of *Amsacta*, *Psalis*, *Pericallia*, *Euproctis*), noctuid larvæ (Spp. of *Prodenia*, *Chloridea*, *Cirphis*, *Euplexia*), butterfly larvæ (Spp. of *Papilio*, *Udaspes*) and the crab caterpillar (*Stauropus*). The host, which is a caterpillar, in these cases does not exhibit any external signs of the presence of parasites until the grubs of these latter come out from inside the host's body to pupate. Evidently in this case the adult parasite thrusts its eggs inside the body of the caterpillar and the grubs that hatch out of the eggs remain feeding inside until pupation, which takes place outside, on the body of the host. Within a few hours after emergence outside, each of these yellowish white larvæ spins a small white oval silken cocoon within which it changes into the pupa. In the meanwhile the host shrivels up and dies, showing a large cluster of white parasitic cocoons attached to its body (see fig. 2, plate I). In some cases the dead caterpillar is covered over by a large mass of these cocoons loosely covered by fluffy silk. As many as a hundred parasites have been noted to emerge from each host. These parasites often kill a good percentage of caterpillars in certain seasons and the writer has noted this more than once in the case of the Noctuids *Chloridea* and *Euplexia*, the Citrus *papilio* and the crab caterpillar on Red gram and tamarind. The genus *Microbracon* (see plate II) is another braconid commonly found, but the species appear to be less numerous and not so very cosmopolitan in taste as *Apanteles*. The species are as big or slightly bigger than *Apanteles* and the female has the ovipositor clearly extending some distance beyond the anus; in colour some are honey coloured while others are brown or red brown. Species of this genus have been noted to attack, among others, the cotton bōliworms (*Earias* and *Pectinophora*), the lablab pod borer (*Adisura*), the cholam stem borer (*Chilo*) and the brinjal bud worm (*Phthorimæa*). The capacity of one species *M. lefroyi* to effectively act as a natural control against the cotton bollworm (*Earias*) was observed in the Punjab a few years ago and I believe trials are even now continued in the use of this parasite. This genus represents a type of parasite where the eggs are generally attached to the body surface of the host quite exposed. From three or four to about eight or ten eggs are attached to the host caterpillar; the shining yellowish white grubs that hatch out also feed exposed. Pupation takes place in rough silken cocoons; but in this case being few, the cocoons do not show themselves conspicuously as a white mass as in *Apanteles*. Of the other striking species of Braconidæ noted, we have species of the genera *Glyptomorpha*, *Iphiaulax* and *Microplitis*. In these examples the host generally harbours a single host as far as observed in South India. *Glyptomorpha* includes fairly large species having flavous or reddish brown colour with the ovipositor very long in some. *G. deesae*, *G. nicevillei* and *G. smeenus* have been noted to attack boring caterpillars and beetle grubs in cane, cholam and pulses. Species of *Iphiaulax* (see plate I, fig. 1), are commoner in the forests and one or two have been noted as parasites on wood boring beetle grubs, chiefly longicorns. The most interesting feature of some of these wasps is the extraordinary intelligence or instinct displayed by the female in spotting out the host larva inside the plant stem and parasitising the same from outside by the mere sense of touch. This is of course found also among many of the Ichneumonid parasites with long ovipositors. The genus *Microplitis*, though not rich in S. Indian species, is interesting from the fact that the one common species *M. ophiuseae*, which the writer has described in a recent paper§ is an important and specific parasite of the semilooper caterpillar (*Achæa*) damaging the castor plant. The presence

§ "An undescribed natural enemy of the castor semilooper," Bombay N. H. S. Journal, XXVIII, p. 298. (Plate).